

I. Amendments to the Claims

This listing of claims replaces without prejudice all prior versions, and listings, of claims in the application:

Listing of Claims:

Claims 1-60 (Cancelled)

Claim 61. (New) A gas separation system for separating a feed gas mixture comprising a first gas component and a second gas component, the gas separation system comprising:

a stator, including a first stator valve surface, a second stator valve surface, and a plurality of function compartments opening into the stator valve surfaces;

a rotor rotatably coupled to the stator, and including a first rotor valve surface, a second rotor valve surface in communication with the second stator valve surface, and a plurality of rotor flow paths for receiving adsorbent material therein for preferentially adsorbing the first gas component in response to increasing pressure in the rotor flow paths in comparison to the second gas component, each said rotor flow path including a pair of opposite ends opening into the rotor valve surfaces for communication with the function compartments; and

a split stream centrifugal compressor having a casing and coupled to a portion of the function compartments, and including a gas inlet for receiving the feed gas mixture, an impeller disposed within the casing and configured for imparting kinetic energy to the feed gas mixture to form an ejected gas flow, a volute defined between the casing and the impeller for receiving the ejected gas flow, and at least two diffusers in communication with the volute for receiving the gas flow from the volute and extending tangentially from the pump casing, wherein one of the at least two diffusers is configured to discharge a boundary layer flow from the gas flow delivered by the volute.

62. (New) The gas separation system as claimed in claim 61, wherein the one of the at least two diffusers extends from an outer wall of the casing.

63. (New) The gas separation system as claimed in claim 62, wherein the one of the at least two diffusers merges with the outer wall of the casing.

64. (New) The gas separation system as claimed in claim 63, wherein the volute is configured to define a flow path for the ejected gas flow received from the impeller, and wherein each of the at least two diffusers includes an inlet communicating with the

volute, and wherein the inlet of the one of the at least two diffusers extending from and merging with the outer wall is disposed earlier in the flowpath than the inlets of the other of the at least two diffusers.